Students Writing For Students

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McDaniel College

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McDaniel’s Mathematics major:
- Theoretical (or CS)
- Problems Solving
- Long-form Capstone presentation
McDaniel’s Mathematics major:
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Can they write?
McDaniel’s Mathematics major:
- Theoretical (or CS)
- Problems Solving
- Long-form Capstone presentation

Can they write?
- Best students could write.
Writing History

McDaniel’s Mathematics major:
- Theoretical (or CS)
- Problems Solving
- Long-form Capstone presentation

Can they write?
- Best students could write.
- No structured writing outside of problem sets
McDaniel’s Mathematics major:
  - Theoretical (or CS)
  - Problems Solving
  - Long-form Capstone presentation

Can they write?
  - Best students could write.
  - No structured writing outside of problem sets
  - No way to check whether graduates could write mathematics
- More *writing* assignments (projects, papers)
- Required paper for Capstone project
- Required drafts for Capstone, revisions in Problem Seminar
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- Required paper for Capstone project
- Required drafts for Capstone, revisions in Problem Seminar

Results – better, but:
- Just receiving and processing feedback
First Steps

- More *writing* assignments (projects, papers)
- Required paper for Capstone project
- Required drafts for Capstone, revisions in Problem Seminar

Results – better, but:
- Just receiving and processing feedback
- Not necessarily *thinking* about writing
More *writing* assignments (projects, papers)

- Required paper for Capstone project
- Required drafts for Capstone, revisions in Problem Seminar

Results – better, but:

- Just receiving and processing feedback
- Not necessarily *thinking* about writing
- No exposure to other writing (good or bad).
Current Efforts

- Number Theory
- Capstone
- Abstract Algebra
Current Efforts

- Number Theory – Full course notes
- Capstone
- Abstract Algebra
Current Efforts

- Number Theory – Full course notes
- Capstone – Drafts, more drafts, and peer reviewed drafts
- Abstract Algebra
Current Efforts

- Number Theory – Full course notes
- Capstone – Drafts, more drafts, and peer reviewed drafts
- Abstract Algebra – Big Theorems
Transitioned to completely IbL with no lecturing after the first week.
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- Version 1 – each student turns in a chapter’s worth of handwritten course notes
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- Version 2 – each student writes 3 weeks’ worth of notes in a TeX file
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- **Version 1** – each student turns in a chapter’s worth of handwritten course notes
- **Version 2** – each student writes 3 weeks’ worth of notes in a TeX file
- **Version 3** – each student writes a day’s worth of notes on Overleaf
Number Theory

Moderate success!
Number Theory

Moderate success!

- Weekly review meetings, opportunities to fix issues
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- Essential part of grade; students only worry about writing clearly
Moderate success!

- Weekly review meetings, opportunities to fix issues
- Essential part of grade; students only worry about writing clearly
- Prize at end of semester!
Senior Capstone

Semester-long independent project

Was: give report on published paper
Is: write paper and give presentation, wider possibilities for project

Initial issues:
- Had trouble finishing in one semester
- Students were unsure of scope, often taking easy routes
- Writing wasn’t very good
Senior Capstone

Semester-long independent project

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• Version 1 – two drafts of paper
Version 1 – two drafts of paper

Version 2 – two drafts of paper (peer review of 4 page draft), practice presentation
Senior Capstone

- Version 1 – two drafts of paper
- Version 2 – two drafts of paper (peer review of 4 page draft), practice presentation
- Version 3 – three drafts, two peer reviews, two practice presentations
Senior Capstone

- Version 1 – two drafts of paper
- Version 2 – two drafts of paper (peer review of 4 page draft), practice presentation
- Version 3 – three drafts, two peer reviews, two practice presentations

Student work improves each time I increase the number of deadlines!
Abstract Algebra

Very theoretical, mostly lecturing.
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Very theoretical, mostly lecturing.

- Version 1 – Similar to Number Theory, full course notes
Abstract Algebra

Very theoretical, mostly lecturing.

- Version 1 – Similar to Number Theory, full course notes
  - Course has less structure than Number Theory
Abstract Algebra

Very theoretical, mostly lecturing.

- Version 1 – Similar to Number Theory, full course notes
  - Course has less structure than Number Theory
  - Too much work
Abstract Algebra

Very theoretical, mostly lecturing.

- Version 1 – Similar to Number Theory, full course notes
  - Course has less structure than Number Theory
  - Too much work

- Version 2 – Big Theorems
Abstract Algebra

Scaled back, focused version of Number Theory writing, plus peer review
Abstract Algebra

Scaled back, focused version of Number Theory writing, plus peer review

- Twice a week, a student writes up the statement and proof of a Big Theorem or Important Example on Overleaf
Abstract Algebra

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- Twice a week, a student writes up the statement and proof of a Big Theorem or Important Example on Overleaf

- Another student is responsible for proof-reading, editing, and comments
Scaled back, focused version of Number Theory writing, plus peer review

- Twice a week, a student writes up the statement and proof of a Big Theorem or Important Example on Overleaf
- Another student is responsible for proof-reading, editing, and comments
- 2 Theorems/Examples on each exam
Future Projects

Where to improve, and where else can I apply this?
Future Projects

Where to improve, and where else can I apply this?

- Streamline Abstract Algebra
Future Projects

Where to improve, and where else can I apply this?

- Streamline Abstract Algebra
- TeX in Fundamentals of Mathematics (intro to proofs)
Future Projects

Where to improve, and where else can I apply this?

- Streamline Abstract Algebra
- TeX in Fundamentals of Mathematics (intro to proofs)
- Calculus?